

Pandemic Influenza Overview

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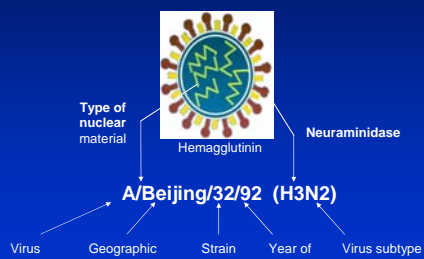


Outline

- What is an influenza pandemic?
- Control measures
- State/local planning issues



Influenza Virus Composition



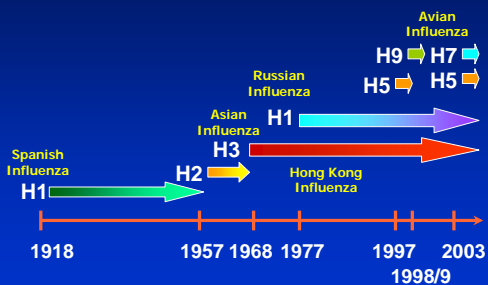
Influenza Antigenic Changes

Structure of hemagglutinin (H) and neuraminidase (N) periodically change

- **Drift:** Minor change, same subtype
 - In 1997, A/Wuhan/359/95 (H3N2) virus was dominant
 - A/Sydney/5/97 (H3N2) appeared in late 1997 and became the dominant virus in 1998
- **Shift:** Major change, new subtype
 - H2N2 circulated in 1957-67
 - H3N2 appeared in 1968 and replaced H2N2
 - **Pandemic potential**



Timeline of Emergence of Influenza A Viruses in Humans



Pandemic influenza: definition

- **Global outbreak with:**
 - Novel virus, all or most susceptible
 - Transmissible from person to person
 - Wide geographic spread



Impact of Past Influenza Pandemics/Antigenic Shifts

Pandemic	Excess Mortality	Populations Affected
1918-19 (A/H1N1)	550,000	Infants and persons age 15-45
1957-58 (A/H2N2)	70,000	Infants, elderly
1968-69 (A/H3N2)	36,000	Infants, elderly



Pandemic influenza: 2nd waves

- 1957: second wave began 3 months after peak of the first wave
- 1968: second wave began 12 months after peak of the first wave



Projected impacts with 30% clinical attack rate

Moderate scenario (like 1957 and 1968)

- Deaths: 207,000
- Hospitalizations: 719,000
- ICU care: 107,850

Severe scenario (like 1918)

- Deaths: 1.9 million
- Hospitalizations: 8.5 million
- ICU care: 1.3 million



Estimated workforce absenteeism during peak week (30% attack rate)

Moderate scenario

- 10%

Severe Scenario (assumes more absenteeism due to fear and/or longer illness)

- 20%



When Will the Next Influenza Pandemic Occur?

2004 – H7N1 Avian virus
2004 – H7N3 Avian virus
2004 – H5N1 Avian virus
2003 – H7N7 Avian virus
2003 – H5N1 Avian virus
1999 – H9N2 Quail virus
1997 – H5N1 Avian virus
1995 – H7N7 Duck virus
1993 – Swine/avian recombinant
1988 – H1N1 Swine virus
1986 – H1N1 Swine virus
1976 – H1N1 Swine flu

Timeline of human infection with novel influenza viruses (since the 1968 pandemic)

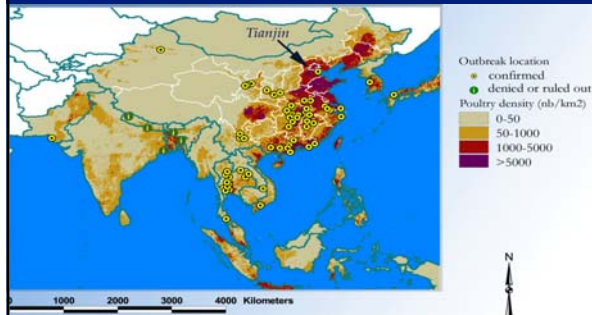


Close calls: avian influenza transmitted to humans

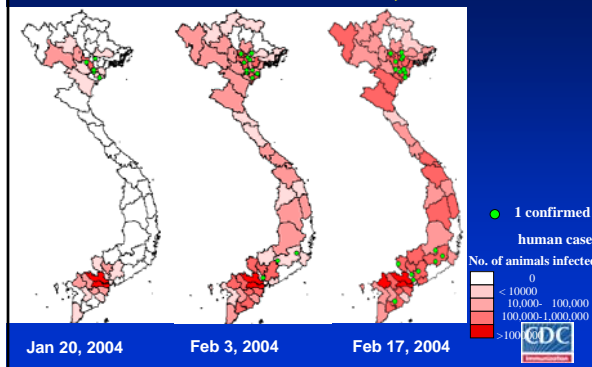
- 1997: H5N1 in Hong Kong
18 hospitalizations and 6 deaths
- 1999: H9N2 in Hong Kong
2 hospitalizations
- 2003:
 - » H5N1 in China
2 hospitalizations, 1 death
 - » H7N7 in the Netherlands
80 cases, 1 death
(eye infections, some resp. symptoms)



Avian Influenza Poultry Outbreaks, Asia, 2003-04



Provinces with Reported Avian Influenza - Viet Nam, 2004



H5N1 Cases & Mortality Through September 2004

Country	H5N1 Cases	Deaths	Case Fatality
Thailand	17	12	71%
Vietnam	90	40	44%
Total	112*	57*	51%

*includes 4 cases from Cambodia and 1 from Indonesia



Avian Influenza Poultry Outbreaks, Asia, 2003-04

- Historically unprecedented scale of outbreak in poultry
- Human cases reported from Vietnam and Thailand
- No sustained person-to-person transmission identified
- Duration of the outbreak creates potential for genetic change that could result in person-to-person transmission

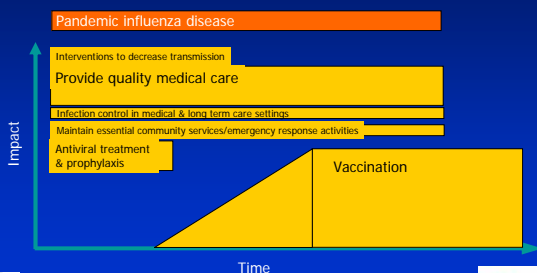


"The pandemic clock is ticking, we just don't know what time it is"

E. Marcuse



Pandemic Response Components

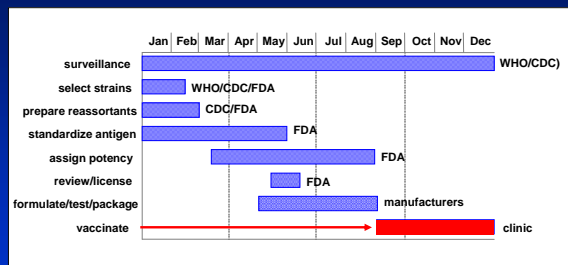


Influenza Control: vaccine

- Cornerstone of prevention
- Annual production cycle ensures availability by late summer/early summer



Vaccine Development



Planning Assumptions

- Delayed vaccine availability (begins 4-6 months after pandemic virus identified)
- Vaccine becomes available at steady rate
-- # doses per month unclear at this point (pending immunogenicity studies)



Policy issues pending

- Vaccine purchase and distribution
- Priority groups for vaccine



State/local planning issues

Define process for reviewing and modifying national recommendations on priority groups
 Develop plan for vaccination of each priority group
 Review legal issues



ACIP/NVAC proposed vaccine priority group recommendations

1A	Vaccine and antiviral manufacturers; HCW	(9M)
1B	Highest risk	(16M)
1C	Pregnant women HH contacts*	(11M)
1D	PH emergency workers Key government officials	(?)
2A	High risk	(58M)
2b	Public safety and other critical infrastructure	(9M)
3	Other key health decision makers; funeral services	(?)
4	Healthy children and adults	(180M)

* Of severely immunocompromised and infants <6m

Influenza control: antiviral drugs

- Uses
 - Prophylaxis
 - Treatment
- Issues
 - Limited supply (about 2 million treatment courses in SNS)
 - Need for prioritization (among risk groups and prophylaxis vs treatment)
 - Unlikely to markedly affect course of pandemic



State/local planning issues

- Planning for different scenarios
 - Antivirals available in private sector (status quo)
 - Stockpile
- High priority groups:
 - Define process for review of national recommendations
 - Logistics of getting antivirals to target groups
- Plans for educating public and medical community about appropriate use
- Legal issues
- Tracking



Policy issues pending

- Priority groups for antiviral drugs



Medical care and maintaining essential functions

- Impact of next pandemic unknown—response to moderate and severe scenario qualitatively different

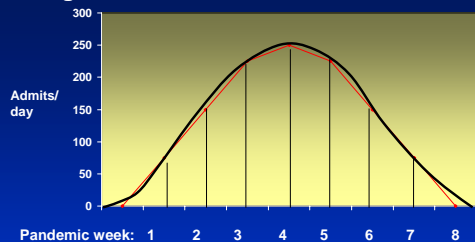


Medical care and maintaining essential functions (2)

- Surge capacity of the hospital system is limited.
- Challenges:
 - Magnitude and duration
 - Staff shortages
 - Limited ability to call in external resources
- Other services will be disrupted

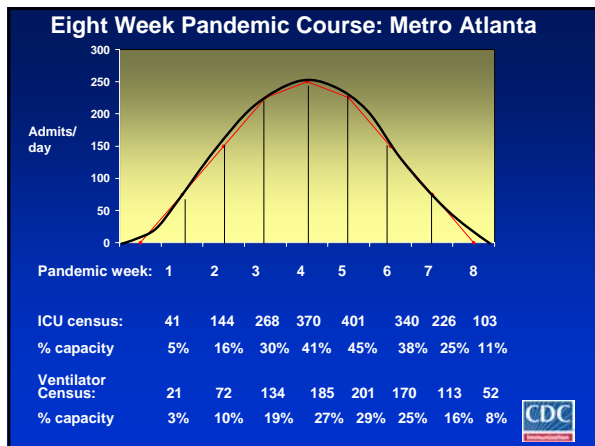


Eight Week Pandemic Course: metro Atlanta



Hospital								
Census:	274	843	1432	1884	1915	1504	925	336
% capacity:	4%	12%	20%	26%	26%	21%	13%	5%
Ambulance								
% increase:	4%	12%	20%	26%	26%	21%	13%	5%





State/local planning issues

- FluSurge
<http://www.cdc.gov/flu/flusurge.htm>

CDC

State/local planning issues

- Identify pandemic influenza –specific issues
 - E.g. do surge capacity plans address worst case scenario
- Work closely with BT planners and others
- Ensure these plans address influenza issues
 - E.g. home health care, triage protocols, provision of care by family members, staff shortages
- Review legal issues

CDC

Influenza control: infection control

- influenza isolation precautions*
 - Private room or with other influenza patient
 - Negative air pressure room, or placed with other suspected influenza cases in area of hospital with independent air supply
 - Masks for HCW entering room
 - Standard droplet precautions (handwashing, gloves, gown and eye protection)

* 1994 Guidelines for Prevention of Nosocomial Pneumonia



Infection control, cont'd

- Feasibility of these measures in a pandemic setting is questionable, priorities should include:
 - Droplet transmission precautions (use of masks and hand hygiene)
 - Cohorting of influenza-infected patients



Influenza control: quarantine

- Challenges
 - short incubation period for influenza
 - Peak infectiousness early
 - clinical illness from influenza infection is non specific
- Not used during annual epidemics
- Could potentially slow onset of a pandemic before sustained person-to-person transmission has been established



Influenza control: other control measures

- School closures, cancellations of large gatherings (?)
- Deferring travel to involved areas
- Education to encourage prompt self-diagnosis
- Public health information (risks, risk avoidance, advice on universal hygiene behavior)
- Hand hygiene



Communications

- Methods: cross-cutting
- Pandemic influenza-specific message development underway at CDC
 - Examples of key aspects: changing nature of messages as pandemic evolves; importance of communications around priority groups (rationale, etc..)



Summary/Conclusion

- Substantial overlap with other preparedness activities
- Unique issues that need to be addressed
- Pandemic planning needs to be an ongoing process

